In the claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently amended) A method for producing a computer readable definition of a photolithographic mask that defines a pattern in a layer to be formed using the mask, wherein said pattern includes a plurality of features; the method comprising:

identifying cutting areas for phase shift regions based upon characteristics of said pattern;

assigning phase values to phase shift windows in the phase shift regions;

wherein said assigning comprises cutting the phase shift regions in selected ones of the cutting areas to define the phase shift windows; and

storing a result of ~~laying out and~~ said assigning in a computer readable medium.

2. (Original) The method of claim 1, wherein said identifying cutting areas includes:

identifying features in the plurality of features characterized by non-critical process latitude to define a set of features;

identifying fields between features in the plurality of features characterized by critical process latitude to define a set of critical fields; and

defining cutting areas as areas within the phase shift regions which extend between two features in the set of features, or between a feature in a set of features and a field outside the phase shift regions, without intersecting a field in the set of critical fields.

3. (Original) The method of claim 1, wherein said assigning comprises applying a cost function to determine the selected ones of the cutting areas.

4. (Original) The method of claim 1, wherein said assigning includes ranking said cutting areas based upon characteristics of said pattern, and determining the selected ones of the cutting areas based upon said ranking.

5. (Previously presented) The method of claim 1, including laying out said phase shift windows in an opaque background.

6. (Previously presented) The method of claim 1, including laying out said phase shift windows in a clear background.

7. (Original) The method of claim 1, wherein a characteristic of said pattern used in said identifying cutting areas, is that said pattern includes elbow shaped features.

8. (Original) The method of claim 1, wherein a characteristic of said pattern used in said identifying cutting areas, is that said pattern includes T-shaped features.

9. (Original) The method of claim 1, wherein a characteristic of said pattern used in said identifying cutting areas, is that said pattern includes polygons larger than a particular size.

10. (Original) The method of claim 1, wherein said identifying cutting areas includes determining parameters for said identifying using simulations, based upon simulation criteria which tends to flag features characterized by non-critical process latitude.

11. (Original) The method of claim 1, wherein said identifying cutting areas includes determining parameters for said identifying using simulations of over-exposure conditions which tends to flag features characterized by non-critical process latitude.

12. (Original) The method of claim 1, wherein said identifying cutting areas includes determining parameters for said identifying using simulations, based upon simulation criteria which tends to flag fields between features in said pattern characterized by critical process latitude.

13. (Original) The method of claim 1, wherein said identifying cutting areas includes determining parameters for said identifying using simulations of under-exposure conditions which tends to flag fields between features in said pattern characterized by critical process latitude.

14. (Previously presented) The method of claim 1, wherein said assigning phase values includes defining a first set of phase shift window inducing θ degrees phase shifting and a second set of phase shift windows inducing ϕ degrees phase shifting.

15. (Original) The method of claim 14, wherein ϕ is equal to approximately $\theta + 180$ degrees.

16-37. (canceled)

38. (Original) A photolithographic mask for defining a pattern in a layer to be formed using the mask, wherein said pattern includes a plurality of features, and said layer includes fields outside said pattern, comprising:

a substrate;

a mask layer of material on said substrate;

the mask layer including phase shift regions and fields, and a plurality of phase shift windows in the phase shift regions, the plurality of phase shift windows characterized by phase shift values that create phase transitions between the phase shift windows to form said pattern, wherein the wherein the boundaries of the phase shift windows lie within cutting areas that are defined based upon characteristics of said pattern.

39. (Previously presented) The mask of claim 38, wherein a set of features in the plurality of features are characterized by non-critical process latitude, and a set of critical fields between features in the plurality of features are characterized by critical process latitude; and

said cutting areas include areas within the phase shift regions which extend between two features in the set of features, or between a feature in the set of features and a field outside the phase shift regions, without intersecting a field in the set of critical fields.

40. (Previously presented) The mask of claim 38, wherein the mask layer comprises an opaque material.

41. (Previously presented) The mask of claim 38, wherein the mask layer comprises a clear material.

42. (Previously presented) The mask of claim 38, wherein a characteristic of said pattern used in defining cutting areas, is that said pattern includes elbow shaped features.

43. (Previously presented) The mask of claim 38, wherein a characteristic of said pattern used in defining cutting areas, is that said pattern includes T-shaped features.

44. (Previously presented) The mask of claim 38, wherein a characteristic of said pattern used in defining cutting areas, is that said pattern includes polygons larger than a particular size.

45. (Previously presented) The mask of claim 38, wherein said phase shift values include θ degrees phase shifting and ϕ degrees phase shifting, wherein ϕ is equal to approximately θ + 180 degrees.

46. (Currently amended) A method for manufacturing a photolithographic mask that defines a pattern in a layer to be formed using the mask, wherein said pattern includes a plurality of features; the method comprising:

identifying cutting areas for phase shift regions based upon characteristics of said pattern;

assigning phase values to phase shift windows in the phase shift regions;

wherein said assigning comprises cutting the phase shift regions in selected ones of the cutting areas to define the phase shift windows; and

applying a result ~~of laying out and~~ said assigning to formation of a mask layer on a substrate.

47. (Original) `The method of claim 46, wherein said identifying cutting areas includes:

identifying features in the plurality of features characterized by non-critical process latitude to define a set of features;

identifying fields between features in the plurality of features characterized by critical process latitude to define a set of critical fields; and

defining cutting areas as areas within the phase shift regions which extend between two features in the set of features, or between a feature in a set of features and a field outside the phase shift regions, without intersecting a field in the set of critical fields.

48. (Original) The method of claim 46, wherein said assigning comprises applying a cost function to determine the selected ones of the cutting areas.

49. (Original) The method of claim 46, wherein said assigning includes ranking said cutting areas based upon characteristics of said pattern, and determining the selected ones of the cutting areas based upon said ranking.

50. (Previously presented) The method of claim 46, including laying out said phase shift windows in an opaque background.

51. (Previously presented) The method of claim 46, including laying out said phase shift windows in a clear background.

52. (Original) The method of claim 46, wherein a characteristic of said pattern used in said identifying cutting areas, is that said pattern includes elbow shaped features.

53. (Original) The method of claim 46, wherein a characteristic of said pattern used in said identifying cutting areas, is that said pattern includes T-shaped features.

54. (Original) The method of claim 46, wherein a characteristic of said pattern used in said identifying cutting areas, is that said pattern includes polygons larger than a particular size.

55. (Original) The method of claim 46, wherein said identifying cutting areas includes determining parameters for said identifying using simulations, based upon simulation criteria which tends to flag features characterized by non-critical process latitude.

56. (Original) The method of claim 46, wherein said identifying cutting areas includes determining parameters for said identifying using simulations of over-exposure conditions which tends to flag features characterized by non-critical process latitude.

57. (Original) The method of claim 46, wherein said identifying cutting areas includes determining parameters for said identifying using simulations, based upon simulation criteria

which tends to flag fields between features in said pattern characterized by critical process latitude.

58. (Original) The method of claim 46, wherein said identifying cutting areas includes determining parameters for said identifying using simulations of under-exposure conditions which tends to flag fields between features in said pattern characterized by critical process latitude.

59. (Previously Presented) The method of claim 46, wherein said assigning phase values includes defining a first set of phase shift window inducing θ degrees phase shifting and a second set of phase shift windows inducing ϕ degrees phase shifting.

60. (Previously presented) The method of claim 59, wherein ϕ is equal to approximately $\theta + 180$ degrees.

61-79. (canceled).

80. (Original) A method of generating a phase shifted representation of a layer of an integrated circuit, the method comprising:

selecting a plurality of structures in a first layer representation of the integrated circuit for definition using a phase shift representation;

defining a plurality of phase shift regions in the phase shift representation for use in defining the plurality of structures;

identifying a plurality of cutting areas in the plurality of phase shift regions, the plurality of cutting areas indicating locations where a phase shift region in the plurality of phase shift regions can be divided into phase shift windows;

ranking the plurality of cutting areas;

identifying, and assigning phase values to, phase shift windows in the phase shift representation by selectively using the plurality of cutting areas and the ranking to resolve phase conflicts; and

generating a second representation of the first layer representation for use in conjunction with the phase shifting region.

81. (Original) The method of claim 80, wherein the second representation comprises a binary trim mask representation for protecting the plurality of structures defined by the phase shift representation and defining other structures in the first layer representation.

82. (Original) The method of claim 80, wherein the second representation comprises an attenuated binary trim mask representation.

83. (Original) The method of claim 80, wherein the ranking comprises treating each of the plurality of cutting areas as equally ranked.

84. (Original) The method of claim 80, wherein the plurality of cutting areas includes a first cutting area and a second cutting area, and wherein the first cutting area ranked as preferred over the second cutting area for selection during the assigning.

85. (Original) The method of claim 84, wherein the first cutting area comprises a cut to field and the second cutting area comprises a cut around a contact hole.

86. (Original) The method of claim 80, wherein the first layer representation comprises a second plurality of structures and wherein the selecting comprises selecting as the plurality of structures substantially all of the structures in the second plurality of structures.

87. (Original) The method of claim 80, wherein the assigning further comprises:

using each of the plurality of cutting areas to divide the plurality of phase shift regions into a plurality of phase shift windows;

assigning phase to each of the plurality of phase shift windows; and

selectively merging phase shift windows in the plurality of windows to reduce number of phase shift windows using the ranking.

88. (Original) The method of claim 80, wherein the assigning further comprises:

representing the plurality of phase shift regions and plurality of cutting areas using a graph data structure, the graph data structure representing the ranking and phase conflicts;

determining phase assignments using the graph data structure.

89. (Original) The method of claim 88, wherein the determining phase assignments further comprises identifying phase conflicts as cycles of odd length in the graph data structure.

90-95. (canceled)